CHAPTER 12 – OBSTETRICS

First Nations and Inuit Health Branch (FNIHB) Clinical Practice Guidelines for Nurses in Primary Care.
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Table of Contents

ASSESSMENT OF THE FEMALE REPRODUCTIVE SYSTEM

– Is this a planned or desired pregnancy?

MENSTRUAL HISTORY

– Age at which menarche occurred
– Start and end dates of most recent normal menstrual cycle
– Was most recent cycle like others in duration and amount of flow? (if not, determine dates of previous normal period)
– Was there any bleeding after most recent normal menstrual cycle?
– Contraceptives: type, when last used

PRESUMPTIVE SYMPTOMS OF PREGNANCY

– Fatigue
– Urinary frequency
– Breast tenderness, tingling or enlargement
– Nausea and vomiting

CURRENT SYMPTOMS

– Nausea and vomiting
– Weight loss or gain
– Headache
– Edema
– Abdominal pain
– Bleeding (determine amount)
– Vaginal discharge (colour, odour)
– Urinary symptoms
– Constipation (usually a later symptom)
– Backache (usually a later symptom)
– Calculate estimated date of delivery: last normal menstrual period vs. uterine size

HISTORY OF PREVIOUS PREGNANCIES

– Dates and locations of previous deliveries
– Gestational age of child when born (for example, preterm, term, or post dates)
– Complications associated with previous pregnancy (for example, preeclampsia, gestational diabetes, abruptio placentae, placenta previa)
– Labour history and complications; in particular, note short labour duration
– Intrapartum complications (for example, abnormal fetal heart rate in labour)
– Delivery history (for example, spontaneous vaginal delivery, cesarean section, shoulder dystocia)
– Condition of infant (for example, Apgar scores, if known)
– Postpartum complications such as postpartum bleeding/hemorrhage or postpartum depression

OTHER RELEVANT INFORMATION

– Ask about intimate partner violence (IPV) as “all women, regardless of socioeconomic status, race, sexual orientation, age, ethnicity, health status, and presence or absence of current partner, are at risk for IPV”[1]
– Woman’s medical and surgical history
– Family history (for example, genetic disorders, neural tube defects, multiple gestation, congenital anomaly, developmental delays, blood disorders)
– Complete review of all systems
– Smoking, alcohol use, use of street drugs
– Use of medications [type; dosage; period of use; prescription or over the counter (OTC), including natural health products, especially ginseng,[2] garlic,[3] and ginkgo[4] which may be associated with adverse effects during pregnancy (for example, bleeding)]

PHYSICAL EXAMINATION

- Apparent state of health
- Appearance of comfort or distress
- Colour (for example, flushed, pale)
- Nutritional status (for example, obese or emaciated), including evidence of vitamin D deficiency (for example, little sun exposure, bone pain, muscle weakness[5])
- Facial edema
- Weight

VITAL SIGNS

- Temperature
- Heart rate
- Respiratory rate
- Blood pressure
- Fetal heart rate (may be difficult to locate in the first trimester)

BREASTS

- Signs of infection
- Masses, tenderness
- Nipples: shape (for example, inverted), erosion, discharge

ABDOMEN

- Striae
- Scars
- Measurement of fundal height, shape of fundus
- Correlation between fundal height and expected date of delivery
- Fetal lie and presentation, and fetal movements (after the first trimester)
- Engagement (usually assessed in the third trimester)
- Uterine tenderness or hardness
- Contractions (for example, Braxton-Hicks)

PELVIS

- Perineal varicosities
- Vaginal bleeding, discharge (colour, odour, consistency)
- Uterine size – estimate if fundus not felt on abdominal exam
- Cervical assessment
- Hemorrhoids
- Previous tears, episiotomy
- Muscular support in the pelvic floor (for example, cystocele, rectocele)

OTHER ASPECTS

- Edema (facial, hands, pretibial, pedal)
- Reflexes
- Pregnancy test

PRENATAL CARE: INITIAL AND SUBSEQUENT VISITS

HISTORY

On Initial Visit

- One or two periods missed (however, may be amenorrheic because of Depo-Provera, Mirena or continuous contraceptive use)
- Feels pregnant and has history of intercourse
- Easily fatigued
- Frequent urination
- Nausea and vomiting
- Anorexia may be present
- Obtain complete medical, social and obstetric history *(see the section "Assessment of the Female Reproductive System")*

On Subsequent Visits

The following features should be assessed at each subsequent visit:

- Headaches
- Facial or peripheral edema
- Abdominal pain
- Vaginal bleeding or discharge
- Urinary complaints
- Respiratory or gastrointestinal disturbances, which may present as pregnancy progresses
- Stressors
- Fetal heart rate

– Abdominal uterine palpation using Leopold's maneuvers
– Normal fetal movements
– Quickening – advise client to record date of first perceived fetal movement (usually occurs between 18 and 22 weeks' gestation)

PHYSICAL FINDINGS

On Initial Visit

Perform a complete examination of all systems.

Vital Signs

– Heart rate: elevated (by about 10 beats per minute) in second half of pregnancy because of increased blood volume
– Blood pressure: a physiological drop usually occurs in second trimester
– Fetal heart rate: 120–160 bpm (first heard between 12 and 18 weeks' gestational age)
– Weight gain between 7 and 18 kg (15–40 lbs) depending on prepregnant BMI

Inspection

– Abdomen: if initial visit is during the first trimester, the uterus is usually not visible
– Breasts: the woman may report her breasts are enlarged and that the areolae and nipples are darker than usual

Palpation

– At initial first trimester visit: conduct an examination of the vagina and cervix. Collect samples for a Pap smear and cervical and vaginal swabs for sexually transmitted infections
– Conduct a bimanual exam to palpate the uterus and adnexa

Auscultation

– Auscultate the woman's heart and lungs at the initial visit. A soft systolic ejection flow murmur may be present (because of expanded vascular volume)

On Subsequent Visits

– Vital signs as listed above *(see "Vital Signs")*
– Measure fundal height from the top of the symphysis pubis to the top of the uterine fundus with a tape measure (in centimetres). Generally, the measurement in centimetres equals number of weeks of gestation after 20 weeks until 36–38 weeks *(see Table 1, "Approximate Measurements of Fundal Height")*
– Assess fetal lie and presentation (for example, transverse, longitudinal, cephalic, breech)
– Assess fetal head in relation to maternal pelvis later in pregnancy
– Fetal heart should be auscultated at each visit. Document the rate and rhythm of heartbeat with normal being between 120 and 160 bpm measured over one minute as well as the location of the fetal heart rate
– Document findings on the antenatal record and graph the fundal height to assess the growth curve

Table 1 – Approximate Measurements of Fundal Height*

Weeks of Gestation	Fundal Height (cm)	Fundal Height (as Measured with Fingers)
8	Not palpable through abdomen	Size of a small grapefruit (bimanual examination)
12	Variable	At symphysis
16	Variable	Halfway between symphysis and umbilicus
20	20	At umbilicus
24	24	3 or 4 fingers above umbilicus
28	28	Halfway between umbilicus and xyphoid process
32	34	3 or 4 fingers below xyphoid
36	36	At xyphoid process
38–40	Variable	2 fingers below xyphoid

*Measurements differ between nulliparous and multiparous women.

DIAGNOSTIC TESTS

Routine Prenatal Blood Work

- Complete blood count
- ABO (blood type) grouping
- Rh antibody screening (at first visit and repeat at 28 weeks)[6]
- Antibody screening
- Rubella titre
- VDRL (Venereal Disease Research Laboratory) or Rapid Plasma Reagin (RPR) testing for syphilis[7]
- Hepatitis B screening
- Hepatitis C screening depending on maternal risk factors (for example, injection drug use)[8]
- HIV test
- Hemoglobin and ferritin: screen once during each trimester (a drop in hemoglobin is expected in the second trimester because of increased blood volume)

Integrated prenatal screening (between 11–14 weeks and 15–20 weeks) and/or maternal serum screening (between 15–20 weeks' gestational age) is to be offered if available and if the woman qualifies for testing in your province/region (for example, women who have had a previous child with an anomaly, or are of advanced maternal age). All women in Canada have a right to be informed about the available tests to predict fetal anomalies (for example, congenital malformations, chromosomal abnormalities) and should receive information related to the available testing.[9] The Genetics Education Project has created a helpful handout for clients (available at: http://www.cheo.on.ca/uploads/genetics/files/genetics-guide-for-women-e.pdf).

Urine Screening and Testing

- At initial visit: midstream urine for urinalysis, routine and microscopy, culture and sensitivity
- Repeat urinalysis at each visit
- Screen once for microscopic examination and culture and sensitivity at 12–16 weeks and repeat as required
- Urine for chlamydia and gonorrhea (first morning void or > 2 hours after last void) at initial visit

There is increased risk of asymptomatic bacteriuria in pregnancy which requires treatment if positive on two consecutive cultures[10] *(see section "Asymptomatic Bacteriuria" in Chapter 6,"Urinary and Male Genital System").*

Cervical and Vaginal Examination

- Pap smear at initial visit
- Cervical swabs or urine sample for chlamydia and gonorrhea are done at initial visit
- Screen **all** women for group B *Streptococcus* with a vaginal/rectal swab at 35–37 weeks' gestation unless they have a positive urine screen for group B *Streptococcus* in the first trimester or have had a previously affected child with group B *Streptococcus*

Diabetes Screening

Screen for gestational diabetes at 24–28 weeks' gestational age or earlier if the woman is at high risk of gestational diabetes. *See "Screening for GDM" under "Gestational Diabetes Mellitus."*

Ultrasound[11]

- 8–10 weeks if needed (for example, date of last menstrual period is not certain, menstrual cycles are not regular) to determine accurate dates. The most current guidelines on antenatal ultrasound suggest a first trimester ultrasound decreases the need for induction at term due to accurate dating
- 11–14 weeks for nuchal translucency testing as part of an integrated prenatal screening program if available and if the woman qualifies for testing in your province/region
- 18–20 weeks routine fetal and placental assessment
- As needed to assess presentation or fetal growth

MANAGEMENT

Goals

- Ensure maternal and fetal well-being
- Provide reassurance and education
- Early identification of problems and complications

Appropriate Consultation

Arrange a consultation with the physician once per trimester if possible and as necessary if an abnormality is identified or suspected. Attempt to have final prenatal visit coincide with physician visit.

Nonpharmacologic Interventions[12]

Client Education

- Encourage adequate dietary intake of protein and fibre
- Recommend an extra 2 or 3 servings from Canada's Food Guide[13]

- Recommend at least 150 grams (5 ounces) of various types of cooked fish each week for the omega-3 fat content. See Health Canada's Food & Nutrition website for information on mercury in fish[14], available at: http://www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/mercur/merc_fish_qa-poisson_qr-eng.php.
- Recommend the following dietary *restrictions* while pregnant:
  i. No more than four Canada's Food Guide servings of canned albacore tuna per week. One serving is 75 g, 2½ oz, 125 mL, or ½ cup[15]
  ii. Avoid vitamin A supplements
  iii. Avoid the use of sugar substitutes with cyclamates/saccharin (for example, Sweet'N Low)
  iv. Discuss caffeine consumption. The recommended amount is less than 300 mg per day[16]
  v. Complete abstinence of alcohol consumption[17]
  vi. Avoid the use of gingko and ginseng
- Recommend avoidance of overeating and excessive weight gain
- Recommend smoking cessation
- Encourage abstinence from alcohol and any illicit drug substances
- Advise client to avoid /minimize use of over-the-counter (OTC) drugs unless ongoing need outweighs risk of continued use
- Recommend daily exercise to maintain physical and mental health
- Discuss signs and symptoms of miscarriage/spontaneous abortion and preterm labour
- Fetal wellbeing can be assessed through daily fetal movement counts starting at 26 weeks.[18] Decreases or changes in fetal movements require investigation. A fetal movement count form is available at: http://www.aphp.ca/pdf/FMCHS0001-132%20(200904)%20(2).pdf
- Discuss breastfeeding
- Advise client that sexual intercourse may be continued if she feels comfortable and there are no specific contraindications
- Encourage attendance at prenatal classes, if offered in the community
- Advise about options during birth, pain management
- Discuss depression
- Discuss postpartum care and contraception

Instruct client to return to clinic if any of the following develop:

- Severe continuous headaches or visual disturbances
- Edema of face or hands
- Recurrent vomiting
- Abdominal pain
- Bleeding
- Rupture of membranes/vaginal discharge
- Decrease in or lack of fetal movement
- Fever, chills or infection in any area
- Preterm labour

Pharmacologic Interventions

Prenatal Multivitamins

A prenatal multivitamin is recommended throughout pregnancy. Advise women to take only one dose of prenatal multivitamin per day.

Iron[19]

Recent Health Canada recommendations for iron supplementation in pregnancy suggest a supplement that provides 16–20 mg daily. However, the majority of prenatal vitamins (for example, Centrum, Materna) contain 27 mg of iron. This amount of iron provided by the prenatal supplement does not pose any significant health risk. The main practical concern is that women may stop taking supplemental iron because of gastrointestinal discomfort associated with higher amounts of iron.

Supplements containing 16–20 mg of iron are available but are not specifically targeted to pregnant women and are not currently covered by NIHB. (Health Canada is working to encourage makers of supplements to reformulate their products to meet the current recommendations.)

If hemoglobin < 100 g/L, start iron:

ferrous gluconate, 300 mg PO 1–3 times per day throughout pregnancy

Folic Acid[20,21]

Women with no personal health risks should select a multivitamin that contains 400 µg (0.4 mg) of folic acid per day as well as vitamin B_{12}. If the pregnancy is planned, encourage women to consider starting folate supplementation 3 months prior to conception.

Clients with health risks, including epilepsy, insulin-dependent diabetes, obesity with BMI > 35 kg/m^2 or a personal or family history of a neural tube defect (for example, spina bifida) should be assessed by a physician or have a physician consulted on

their behalf. Also, clients with a history of poor compliance to medications and additional lifestyle issues such as variable diet or possible teratogenic substance use (for example, alcohol, tobacco, recreational nonprescription drugs) should also have their case discussed with a physician. They will require increased dietary intake of folate-rich foods and higher daily doses of folic acid (for example, 5 mg/day) beginning at least three months before conception and continuing until 10–12 weeks post-conception, at which time they are normally switched to a multivitamin containing folic acid 0.4 mg/day.

Vitamin D[22]

The Canadian Paediatric Society recommends supplementation with at least 1000 international units of vitamin D daily, in particular during the winter months.

Anti-D Immune Globulin[23]

Rh-negative women at 28 weeks' gestation (after repeat Rh antibody screening confirms and fetal blood type is unknown or Rh-positive) and after physician consultation:

anti-D immune globulin (WinRho), 300 µg IM at 28 weeks

Monitoring and Follow-Up

Antenatal Records

Ensure the antenatal records are kept up to date with all required information entered on them. *See "Antenatal Resources by Province."*

At 20 weeks a copy of the antenatal records (including all blood work and ultrasound results) is to be sent to the labour and delivery team/provider(s). Document the sharing of records in the client's chart.

Between 34 and 36 weeks, fax all prenatal documents [including ultrasound(s), laboratory results and the antenatal records] to the labour and delivery ward. Also, provide the client with a copy. Document the sharing of records in the client's chart.

Upon client discharge from the hospital after giving birth, ensure that the newborn assessment, labour and delivery summary and postpartum record for the woman and baby have been received so that informed follow-up care can be provided.

Referral

- Refer to a physician or obstetrician as soon as possible if high risk factors/markers are identified
- Women with a positive Rh screen in pregnancy need an obstetrical referral for additional antibody screening. Women with a positive screen can develop Rhesus (Rh) alloimmunization, which can cause erythroblastosis fetalis and hemolytic disease of the newborn[24]
- Arrange for transfer to hospital for delivery at 36–38 weeks' gestational age according to regional policy (sooner if a high-risk pregnancy)

COMMON OBSTETRIC PROBLEMS AND SITUATIONS

EARLY-ONSET GROUP B STREPTOCOCCAL INFECTION PROTOCOL[25,26]

Early-onset neonatal Group B streptococcal (GBS) disease occurs in the first seven days of life and continues to be a major cause of neonatal morbidity and mortality.

Late-onset GBS disease occurs after 1 week of age. Most cases of late-onset GBS disease occur in the first 3 months of age. The remainder of the information is only related to early-onset GBS disease.

The rate of GBS disease is now reported to be 0.34 per 1000 live births. This is in comparison to the 1970 rate of 3 per 1000 live births. Estimates of GBS colonization rates among pregnant women range from 15–35%. Without maternal intrapartum antibiotic treatment, neonatal GBS transmission occurs approximately 50% of the time. Of those neonates colonized by GBS, 1–2% will develop early-onset GBS disease.

The current strategy to prevent neonatal GBS disease is through antibiotic prophylaxis. It is important to note that no strategy can prevent all cases of early-onset GBS disease.

CAUSES

The most likely source of early-onset GBS is from the maternal gastrointestinal tract which can lead to vaginal colonization. Neonatal transmission may occur when the neonate passes through the vaginal canal, when the infection ascends the maternal genital system, or when the neonate aspirates bacteria-infected amniotic fluid.

RISK FACTORS

Some women will have risk factors that indicate administration of antibiotics regardless of GBS status. These risk factors are:

- Preterm labour at < 37 weeks' gestational age with unknown or positive GBS status
- Term labour (> 37 weeks' gestational age) with prolonged rupture of membranes (> 18 hours)
- Maternal fever during labour (> 38°C)
- Women with a documented GBS bacteriuria during pregnancy. These women do not need GBS vaginal-rectal screening at 35–37 weeks' gestation as described in the diagnostic section below
- Women with a history of giving birth to an infant with GBS disease

DIAGNOSTIC TESTS

The Society of Obstetricians and Gynaecologists of Canada[27] and the Centers for Disease Control and Prevention[26] offer the following recommendations:

- Universal screening of all pregnant women at 35–37 weeks' gestation with a vaginal-rectal swab for culture and sensitivity. The swab is inserted into the vagina, along the perineum and through the anal sphincter. Research has demonstrated that self-collected specimens are as accurate as those collected by health care professionals when women are provided adequate instruction

MANAGEMENT[27]

Women with a positive GBS culture will receive IV prophylactic antibiotics once in active labour.

Appropriate Consultation

Consult a physician if the woman with a positive GBS culture is in labour.

Nonpharmacologic Interventions

Ensure GBS status is documented on the woman's antenatal record and the result of the testing is faxed to the labour and delivery ward.

Pharmacologic Interventions[27]

Given at least 4 hours before delivery when possible (and continued until delivery), administer IV antibiotic prophylaxis after consultation with a physician. The most common antibiotic regimen for intrapartum prophylaxis is:

penicillin G 5 million units IV followed by 2.5 million units q4h until delivery

For women with allergy to penicillin and not at risk for anaphylaxis:

cefazolin 2 g IV then 1 g q8h until delivery

For women with allergy to penicillin and at risk for anaphylaxis:

azithromycin 500 mg IV q24h until delivery

or

clindamycin 900 mg IV q8h until delivery

If the GBS culture demonstrated resistance to clindamycin or erythromycin/azithromycin or if susceptibility is unknown, administer vancomycin 1g IV every 12 hours until delivery.

GESTATIONAL DIABETES MELLITUS[28]

Gestational diabetes mellitus (GDM) is defined as hyperglycemia with onset or first recognition during pregnancy.[29] In Canada, the prevalence of GDM is higher than previously thought – 3.7% in the non-Aboriginal population and 8–18% in Aboriginal population. Women who develop GDM have an increased risk of developing type 2 diabetes later in life. Of Aboriginal women who are diagnosed with GDM, up to 70% will develop type 2 diabetes.[30] Gestational diabetes mellitus should be differentiated from a woman with pre-existing type 2 diabetes mellitus who is pregnant, as the management may be very different.

CAUSES

The exact cause of diabetes has not yet been determined. Genetics, environmental and nutritional influences are likely associated with diabetes.

RISK FACTORS[31]

- Maternal BMI ≥ 30 kg/m^2 and/or overweight prior to pregnancy
- Hypertension
- Polyhydramnios
- Repeated glycosuria (> +1)
- Suspected fetal macrosomia

– Maternal age ≥ 35 years
– Women of Aboriginal, Hispanic, South Asian, Asian or African descent
– Acanthosis nigricans
– Corticosteroid use
– History of GDM or glucose intolerance
– Family history of diabetes
– Unexplained stillbirth
– Previous infant with congenital anomalies
– Previous delivery of a macrosomic infant
– Recurrent fetal loss
– Polycystic ovarian syndrome

HISTORY

Women with GDM are generally asymptomatic, however, the following may be found:

– Polydipsia
– Polyuria
– Polyphagia
– Recurrent urinary tract infections or vaginal candidiasis

PHYSICAL FINDINGS

– Fundal height may be greater than expected for gestational dates

COMPLICATIONS

– Risk of diabetes complications *(see the section "Diabetes Mellitus" in Chapter 10, "Hematology, Metabolism and Endocrinology")*
– Fetal hyperinsulinemia
– Increased birth weight of infant
– Higher rates of cesarean sections
– Increased rates of neonatal hypoglycemia
– Congenital anomalies

DIAGNOSTIC TESTS[28,32]

– Urine: glucose or ketones may be detected by dipstick test

SCREENING FOR GDM[28]

There is considerable variability among diabetes experts nationally and internationally with regard to GDM screening. International and national expert organizations recommend that all women who have Aboriginal ancestry receive diabetes screening in pregnancy.[28,32,33]

The Canadian Diabetes Association (2008) recommends that all pregnant women be screened for GDM between 24 and 28 weeks' gestation. Women with more than one risk factor *(see "Risk Factors")* should receive screening at their first prenatal visit and if negative results occur, they should be rescreened once each trimester.

Perform a 50 g oral gestational diabetes screen (GDS) followed by a plasma glucose level measured 1 hour later. The 50 g GDS can be performed at any time of day. GDM may or may not be diagnosed with the 50 g GDS. It is diagnostic of GDM if the glucose level after 1 hour is ≥ 10.3 mmol/L.

If the GDS result is 7.8–10.2 mmol/L or if GDM is strongly suspected (before the GDS is completed), perform the 75 g oral glucose tolerance test (GTT). It is a screening and a diagnostic test that requires fasting for more than 8 hours prior to the test. Women should not smoke before the test and remain seated during the test. For an oral GTT:

– A fasting plasma glucose sample is drawn
– The woman is given 75 g of glucose
– Plasma glucose samples are drawn at 1 and 2 hours

The 75 g oral GTT is diagnostic of GDM if 2 or more of the following occur:

Fasting plasma glucose ≥ 5.3mmol/L

1 hour plasma glucose ≥ 10.6 mmol/L

2 hour plasma glucose ≥ 8.9 mmol/L

If one of the above criteria occur the client has impaired glucose tolerance of pregnancy.

MANAGEMENT

Goals of Treatment

– Identify condition early
– Optimize control of blood sugar

Appropriate Consultation

Consult a physician as soon as abnormal glucose tolerance is diagnosed in a pregnant woman. Thereafter, consult a physician if: failure to gain weight or weight loss present; client is symptomatic; pre-meal glucose levels cannot be maintained below 5.3 mmol/L within 2 weeks of treatment with nutrition therapy; or any complications are identified *(see "Complications")*.

Nonpharmacologic Interventions

Dietary adjustment is the mainstay of therapy and should be done in collaboration with a dietitian.

- The total weight gain and energy intake should take into consideration the pre-pregnancy BMI (an online Pregnancy Weight Gain Calculator is available at: http://www.hc-sc.gc.ca/fn-an/nutrition/prenatal/bmi/index-eng.php)
- Energy intake for overweight or obese women may be restricted if weight gain is appropriate and ketosis is avoided
- Monitor ketones to verify adequate caloric intake to prevent ketone formation
- Type and amount of carbohydrate are based on clinical measurements and therefore individualized based on gestational weight gain, fasting blood sugar levels, 1-hour post-meal glucose levels, ketones, and serum triglyceride levels
- Total mixed carbohydrates should comprise 40–45% of total energy or up to 50% of energy from slowly released carbohydrate sources (low glycemic index)
- The amount of carbohydrates at breakfast may need to be limited if morning glucose intolerance is present. Carbohydrates should be distributed throughout the day's meals and snacks[34]
- Regular meals are important
- Discourage excessive salt use
- Use of artificial sweeteners acesulfame potassium, aspartame, and sucralose are acceptable during pregnancy and lactation[34]
- Encourage exercise, which is especially beneficial when combined with dietary therapy
- Encourage home glucose monitoring four times daily (fasting and postprandial)
- Encourage use of a diabetic log, and review home glucose monitoring records at each visit *(see targets listed under "Pharmacologic Interventions")*
- Prevention of excessive weight gain is important
- Provide support and reassurance during pregnancy
- Breastfeeding should be encouraged and supported for all women but especially those with any form of diabetes as this is beneficial to the woman and to decrease risk of diabetes in the child[35]

Diabetic education is ideal.

Pharmacologic Interventions

Women with gestational diabetes should strive to attain the following glycemic targets; these are associated with the best pregnancy outcomes:

- Fasting/Preprandial glucose 3.8–5.2 mmol/L
- 1 hour postprandial < 7.8 mmol/L
- 2 hour postprandial < 6.7 mmol/L

Women with gestational diabetes who do not achieve glycemic targets within 2 weeks of diagnosis with dietary measures will need to start insulin. Discuss with physician.

Insulin requirement tends to rise as pregnancy progresses, so frequent dose adjustments may be needed. Consult a physician or nurse practitioner for adjustments.

Monitoring and Follow-Up

Follow up every 2 weeks until 36 weeks' gestational age and then weekly. Assess the following:

- Dietary compliance
- Weight gain or loss
- Peripheral edema
- Blood pressure
- Uterine size
- Fetal growth
- Home glucose monitoring results

Check fasting blood glucose level at each visit. If > 10.5 mmol/L (or if postprandial values are > 12.0 mmol/L), the client should be admitted to hospital for dietary review. Consult a physician.

Ultrasound for those with GDM

An early pregnancy ultrasound should be performed on every woman with GDM for multiple reasons.

- Diabetic clients are at increased risk of fetal anomalies, and first trimester nuchal translucency and/or integrated prenatal screening can be performed
- First trimester dating is more accurate in predicting gestational age than later ultrasounds. This information may be important should an induction of labour be recommended

If macrosomia is suspected, ultrasound should be performed. Arrange an obstetrical consultation following the ultrasound.

Other Follow-Up

- Antepartum non-stress testing is often initiated on a weekly basis at 34–35 weeks' gestation but may be started earlier. If there is a history of stillbirth, suggest antepartum testing 2 weeks before the gestational age of the previous stillbirth
- After 38 weeks' gestation, fetal surveillance is initiated, and delivery is recommended if there is any evidence of fetal compromise

Postpartum

All women with GDM should have a 75 g oral GTT between 6 weeks and 6 months postpartum and when planning a future pregnancy to rule out type 2 diabetes. They should also receive healthy lifestyle counselling.

Referral

- Refer to a dietitian for assessment and counselling during pregnancy and postpartum, if available
- Arrange an obstetrical consult
- Obstetrical follow-up should be by a physician whenever possible
- Women with GDM may need to be evacuated earlier than usual

HYPEREMESIS GRAVIDARUM

Nausea and vomiting in pregnancy (NVP) is the most common medical condition in pregnancy, affecting 50–90% of all pregnant women.[36] Hyperemesis gravidarum (HG) is persistent nausea and vomiting severe enough to produce a 5% weight loss from pre-pregnant weight, electrolyte imbalance, and ketonuria.

Hyperemesis gravidarum can greatly and negatively impact a woman's life.

CAUSES

Unknown.

When NVP and/or HG are present in pregnancy, alternate causes need to be investigated.

The prevalence of hyperemesis gravidarum is about 1% overall, but is higher in multiple gestation and molar pregnancies. The recurrence rate in subsequent pregnancies is 26%.

HISTORY

- Persistent and excessive nausea and vomiting, sometimes throughout the day
- Client unable to keep down any solids or liquids

If the condition is prolonged, client may also report:

- Fatigue
- Lethargy
- Headache
- Faintness
- Weight loss

PHYSICAL FINDINGS

- Heart rate may be elevated and weak
- Blood pressure normal, but may be low if dehydrated
- Postural blood pressure drop may be present if dehydrated
- Weight may be reduced from previous measurement
- Client appears in mild to moderate distress
- Various degrees of dehydration may be present: skin may be pale, there may be dark circles under eyes, eyes may appear sunken, mucous membranes may be dry, skin turgor may be poor
- Mild jaundice, which returns to normal after adequate hydration and nutrition
- Uterus may be smaller or larger than expected for dates

DIFFERENTIAL DIAGNOSIS

- Hydatidiform mole
- Multiple gestation
- Other medical causes of vomiting (for example, gastroenteritis, pancreatitis)

COMPLICATIONS

- Dehydration
- Electrolyte disturbances
- Nutritional deficiencies
- Intrauterine growth restriction (IUGR) *(see the section "Intrauterine Growth Restriction")*
- Fetal death

DIAGNOSTIC TESTS

- Urinalysis: routine and microscopic (urine concentrated; ketones may be present; oliguria)

MANAGEMENT

Goals of Treatment

- Recognize condition early
- Prevent complications
- Exclude organic causes (for example, urinary infection, hepatitis, disorders of the gastrointestinal tract, gallbladder or pancreas)

Appropriate Consultation

– Consult a physician if nonpharmacologic interventions fail to control symptoms in milder cases
– Consult a physician immediately if the woman shows signs of dehydration on presentation

Adjuvant Therapy

If client is significantly dehydrated, after consultation with a physician:

– Start IV therapy with normal saline
– Adjust rate according to state of hydration

If hypovolemia is present, see protocol for managing hypovolemic shock *(see the section "Shock" in Chapter 14, "General Emergencies and Major Trauma").*

Nonpharmacologic Interventions

– Reassure the woman that the condition generally improves with time, usually by end of first trimester
– Advise the woman to get out of bed slowly in the morning and to keep soda crackers at the bedside, which may be eaten before getting up
– Advise woman to eat small, frequent meals of food and fluids that are well tolerated
– Emphasis is on intake, not on content of meals while client is symptomatic; *see Table 2, "Foods that May be Appealing to Pregnant Women"* for suggestions of foods that may appeal to pregnant women because of their taste and texture
– Suggest that someone else do the cooking at home, as food odours may provoke nausea
– Omit iron supplements until nausea resolves
– Ask client to monitor intake and urine output at home
– Recommend increased rest, as fatigue seems to exacerbate symptoms; client may need help with other children in the home
– Arranging a leave of absence from work early in the pregnancy may reduce the overall time lost from outside employment
– Psychotherapeutic measures (for example, stimulus control, biofeedback, relaxation techniques and imagery) may be helpful
– Acupressure at the P6 (Neiguan) point on the inner (anterior) aspect of the wrists, just proximal to the flexor crease in the middle of the forearm has been shown to reduce the symptoms of nausea and vomiting in pregnancy[36]
– Ginger ingestion has also demonstrated benefits to alleviating nausea and vomiting in pregnancy[37,38,39,40]

Table 2 – Foods that May be Appealing to Pregnant Women

Taste or Texture	Food Suggestions
Salty	Chips, pretzels
Tart, sour	Pickles, lemonade
Earthy	Brown rice
Crunchy	Celery sticks, apples
Bland	Mashed potatoes
Soft	Bread, noodles
Sweet	Sugary cereal
Fruity	Juices, fruity Popsicles
Wet	Juices, seltzer drinks
Dry	Crackers

Pharmacologic Interventions[41,42]

If medication is needed to control vomiting, discuss with physician.

Drug of choice (has the greatest evidence to support efficacy and safety):

doxylamine/vitamin B_6 (Diclectin), 2 tabs PO hs

Diclectin is a delayed-release medication and should be taken regularly for optimal effect.

If effect is insufficient, in addition to the 2 tabs PO hs add 1 tab PO bid (for example, morning and mid-afternoon). This delayed-release formulation works best when given 4–6 hours prior to anticipated nausea.

While waiting for Diclectin from retail pharmacy, if not available at nursing station:

dimenhydrinate 50–100 mg PO/PR q4-6h prn not to exceed 400 mg per day; not to exceed 200 mg per day if client is also taking Diclectin

Monitoring and Follow-Up

Follow up weekly until symptoms resolve:

– Measure fundal height and compare with previous values
– Monitor fetal heart rate
– Monitor vital signs, weight, urine output and ketones

If client is significantly dehydrated, consult with physician.

– Initially maintain nothing by mouth
– Bed rest

Referral

Medevac for further investigation and treatment if warranted after consultation with a physician.

HYPERTENSIVE DISORDERS OF PREGNANCY[43]

Hypertension in pregnancy is defined as a diastolic blood pressure above 90 mmHg.[43,44] Women with systolic blood pressures over 140 mmHg require further assessment.

The SOGC classifies hypertension in pregnancy as either pre-existing or gestational.

Pre-existing hypertension

– This form of hypertension exists before pregnancy, or appears before 20 weeks' gestation

Gestational hypertension

– This is a form of hypertension that appears at or after 20 weeks' gestation

Both of these classifications have two possible subgroups:

1. with comorbid conditions (for example, diabetes)
2. with preeclampsia
   – *Preeclampsia* in women with pre-existing hypertension should be defined as resistant hypertension, new or worsening proteinuria, or one or more other adverse conditions
   – *Preeclampsia* in women with gestational hypertension should be defined as new-onset proteinuria or one or more adverse conditions
   – Adverse conditions include headache, visual disturbances, abdominal or chest pain, nausea or vomiting, pulmonary edema, elevated serum creatinine

Women may belong to more than one subgroup.

For more information on the more serious hypertensive disorders of pregnancy *see the section "Severe Hypertension, Severe Preeclampsia and Eclampsia."*

RECOMMENDATIONS ON CRITERIA FOR DIAGNOSIS[45]

– Diastolic blood pressure (BP) ≥ 90 mmHg should be the criterion for diagnosis of hypertension in pregnancy, based on the average of at least two measurements from the same arm 15 minutes apart
– Women with a systolic BP ≥ 140 mmHg should be followed closely for development of diastolic hypertension
– Severe hypertension should be defined as a systolic BP of ≥ 160 mmHg or a diastolic BP ≥ 110 mmHg. A repeat measurement should be taken for confirmation in 15 minutes *(see the section "Severe Hypertension, Severe Preeclampsia and Eclampsia")*
– For non-severe hypertension, serial BP measurements should be recorded before a diagnosis of hypertension is made

CAUSES

Unknown.[46]

HISTORY

– Most common in the nulliparous woman[47]
– Client often < 20 years of age or > 40 years of age
– Symptoms can range from minimal to severe
– Severe disease: headache, visual disturbance, altered consciousness, epigastric or right upper quadrant pain, nausea, vomiting, dyspnea

PHYSICAL FINDINGS

– Physical findings depend on severity of disease
– Severity of disease determined by relative increase in blood pressure above client's normal readings, and presence of symptoms and signs
– A calibrated mercury sphygmomanometer, an aneroid device, or an automated BP device that has been validated for use in preeclampsia along with an appropriate-sized cuff, are the instruments of choice. A rest period of 10 minutes should be allowed before the blood pressure is measured. The woman should be sitting upright with her feet on the floor and the cuff should be positioned at the level of the heart. Korotkoff phase V should be used to designate the diastolic pressure
– Automated BP machines may underestimate BP in women with preeclampsia. Compare BP readings using a mercury sphygmomanometer or an aneroid device
– All pregnant women should be assessed for proteinuria at each visit[45]
– Urinary dipstick testing may be used when suspicion of preeclampsia is low. Proteinuria should be strongly suspected when urinary dipstick proteinuria is ≥ 2+

- Creatinine ratio or 24-hour urine collection should be the standard method for determining proteinuria. Proteinuria should be defined as ≥ 0.3 g/d in 24-hour urine collection or ≥ 30 mg/mmol urinary creatinine in a spot (random) urine sample[45]
- Edema and weight gain are not diagnostic criteria of preeclampsia

Severe Disease

- Edema of face, hands, and feet may be present
- Rapid weight gain may be present
- Epigastric, chest, or right upper quadrant pain
- Deep tendon reflexes show hyperreflexia
- Upon auscultation of the lungs and heart, crackles and wheezing may be heard, because of pulmonary edema

DIFFERENTIAL DIAGNOSIS

- White-coat hypertension

COMPLICATIONS

- Eclampsia
- Maternal morbidity and mortality
- Fetal morbidity and mortality
- Preterm delivery
- Abruptio placentae
- Intrauterine growth restriction (IUGR)
- **H**emolysis, **E**levated **L**iver enzymes and **L**ow **P**latelet count (HELLP) syndrome *(see the section "Severe Hypertension, Severe Preeclampsia and Eclampsia")*

HELLP SYNDROME[48]

A combination of laboratory results signal a variation of severe preeclampsia. It is marked by **h**emolytic anemia, **e**levated **l**iver enzymes, and **l**ow **p**latelet count. This potentially life-threatening condition usually arises in the last trimester of pregnancy. Initially, affected clients may complain of nausea, vomiting, epigastric pain, headache, and vision problems. Complications may include acute renal failure, disseminated intravascular coagulation, liver failure, respiratory failure, or multiple organ system failure.

DIAGNOSTIC TESTS[47]

- Blood pressure
- Hematologic assessments
  - CBC (including hemoglobin, platelet, blood film)
  - PTT, PT (INR), Fibrinogen, D-dimer
- Hepatic assessments
  - ALT, AST, LDH, bilirubin
  - Albumin
- Renal assessments
  - Urine dipstick for proteinuria
  - Electrolytes, serum creatinine, BUN and uric acid
  - 24-hour urine collection for total protein and creatinine clearance

MANAGEMENT

Goals of Treatment

- Identify the condition early
- Prevent maternal and fetal complications

Appropriate Consultation

Consult with a physician as soon as possible if elevated blood pressure (systolic > 140 mmHg or diastolic > 90 mmHg) is measured, preeclampsia and/or comorbid conditions are present, or if symptomatic disease is discovered.

Nonpharmacologic Interventions

- Nonpharmacologic management should be considered for any pregnant woman with a systolic BP of 140–150 mmHg or a diastolic BP of 90–99 mmHg, or both, as measured in a clinical setting. Consult with a physician to determine a management plan
- Supportive management, dependent on BP, gestational age, and presence of associated maternal and fetal risk factors, includes close supervision, limitation of activities and some bed rest
- Abstention from alcohol[43]
- Exercise for maintenance of fitness
- Encourage smoking cessation
- Pre-existing hypertension should be managed the same way as before pregnancy. However, additional concerns are the effects on fetal well-being and the potential of worsening of hypertension during the second half of pregnancy
- There is, as yet, no treatment that will prevent exacerbation of the condition

Client Education

- Explain disease course and management plan
- Stress the necessity of frequent monitoring for early detection of disease progression
- Instruct client to return to clinic immediately if symptoms progress

Pharmacologic Interventions

Calcium supplementation (of at least 1 g/day, orally) is recommended for women with low dietary intake of calcium (< 600 mg/g). Do not prescribe calcium unless advised to do so by a physician.

Antihypertensive medication as prescribed by a physician. Some antihypertensive drugs are contraindicated in pregnancy:

- All angiotensin-converting enzyme (ACE) inhibitors (benazepril, captopril, cilazepril, enalapril, fosinopril, lisinopril, perindopril, quinapril, ramipril, trandolapril)
- All angiotensin II receptor antagonists (candesartan, eprosartan, losartan, olmesartan, telmisartan, valsartan)
- The renin inhibitor aliskiren
- Atenolol is not recommended during pregnancy because it has been associated with IUGR[49,50]
- Prazosin (rarely used for hypertension in any setting) is not recommended during pregnancy because of an association with stillbirth[50]

Monitoring and Follow-Up

- Monitor vital signs and general condition for progression of symptoms to severe preeclampsia or eclampsia at least weekly
- Assess fetal heart and fetal movement
- Monitor intake and urine output closely

Referral

A short-term stay in hospital may be required for diagnosis and to rule out severe hypertension and/or severe preeclampsia; in preeclampsia, the only effective treatment is delivery. Consult with a physician or nurse practitioner.

Medevac to hospital for evaluation may be advisable if there are significant symptoms and at-home management is not deemed feasible. Arrange this in consultation with a physician or nurse practitioner.

For clients with severe hypertension, severe preeclampsia or eclampsia, *see the section "Severe Hypertension, Severe Preeclampsia or Eclampsia."*

INTRAUTERINE GROWTH RESTRICTION

Intrauterine Growth Restriction (IUGR) is defined as a "failure of the fetus to attain its expected fetal growth at any gestation age."[51]

Small for gestational age (SGA) is a term that is used to describe a fetus that falls below the 10th percentile for weight and gestational age.[52]

IUGR and SGA are not interchangeable terms. IUGR is a result of a fetus not reaching its full growth potential. An IUGR fetus may not necessarily be SGA.

According to the Alberta Perinatal Health Program (2008), 40% of SGA fetuses are constitutionally small and are healthy and 20% are SGA secondary to chromosomal or environmental influences. The remaining 40% are at high risk for poor perinatal outcomes, including IUGR and/or fetal demise.[52]

DIAGNOSIS

- Accurate dating of pregnancy, ultrasound to confirm at 18–20 weeks or earlier if last menstrual period date is uncertain
- Assess for risk factors such as diabetes, hypertension, vascular disease, severe anemia, chronic illness, recent maternal infections, medications, previous fetus/newborn with IUGR, smoking, alcohol and substance abuse
- Physiologic factors such as maternal height and weight, age, parity, maternal nutritional intake, fetal infection or congenital malformations, multiple gestation

HISTORY

- Can become apparent in the second and third trimesters
- Woman may report lack of growth
- Altered fetal movements (increased or decreased)
- Hypertension, preeclampsia or gestational diabetes mellitus may be present
- History of maternal illness

PHYSICAL FINDINGS

– Weight unchanged from previous visit
– Fundal height unchanged or less than expected from previous visit. Consistent technique ensures precision (maternal positioning, empty bladder, measuring from symphysis to top of fundus in centimetres, charting the information on the growth curve in the antenatal form). Suspicion should be raised if fundal height does not exhibit the predicted 1 cm/week growth between 20 and 36 weeks of gestation. A discrepancy in fundal height by 4 cm warrants ultrasound evaluation
– Fetal well-being can be assessed through daily fetal movement counts starting at 26 weeks.[53] Decreases or changes in fetal movement counts require investigation. A fetal movement count form is available at: http://www.aphp.ca/pdf/FMCHS0001-132%20(200904)%20(2).pdf

DIFFERENTIAL DIAGNOSIS

– Miscalculation of dates
– Improper measurement on previous assessment
– Intrauterine death
– Transverse lie
– Oligohydramnios

COMPLICATIONS

Antepartum Complications

– Oligohydramnios
– A fetus with IUGR may experience complications during labour and delivery
– Intrauterine death

Potential Neonatal Complications

Neonates with IUGR are at an increased risk of:[54]

– Meconium aspiration
– Respiratory distress
– Hypoglycemia
– Necrotizing enterocolitis
– Thrombocytopenia
– Temperature instability
– Renal failure
– Risks associated with prematurity
– Risks associated with congenital malformations/chromosomal anomalies
– Neonatal death

DIAGNOSTIC TESTS

– Ultrasound

Ultrasound is needed for definitive diagnosis.

MANAGEMENT

Goals of Treatment

– Nutrition education
– Avoidance of substance use and smoking cessation may prevent IUGR
– Early identification of associated disorders (for example, diabetes mellitus, hypertension)

Appropriate Consultation

Consult a physician immediately if this diagnosis is detected or suspected.

Nonpharmacologic Interventions

– Provide support to client and family
– Encourage the woman's awareness of fetal movement by teaching daily fetal movement counts starting at 26 weeks.[53] Decreases or changes in fetal movement counts require investigation. A fetal movement count form is available at: http://www.aphp.ca/pdf/FMCHS0001-132%20(200904)%20(2).pdf

Pharmacologic Interventions

None.

Monitoring and Follow-Up

– Once this diagnosis is made, the frequency of prenatal visits is increased. The frequency of visits is dependent on the underlying cause of IUGR and should be established after consultation with a physician/obstetrician

Referral

Refer to an obstetrician as soon as possible for further assessment. Close antenatal surveillance is required, and the decision as to when to deliver the infant is complex.

MULTIPLE GESTATION

Presence of more than one fetus in a single pregnancy.

CAUSES

- Fertilization of more than one ovum (non-identical twins)
- Splitting of one fertilized ovum into two separate embryos (identical twins)

RISK FACTORS

- Familial history of multiple gestation
- Infertility therapy[55]
- Increased maternal age[56]

HISTORY

Suspect multiple gestation in clients with family history of multiple gestation and in those receiving drug treatment for infertility.

- Discomforts of pregnancy present earlier and are more pronounced
- Morning sickness, nausea and heartburn present earlier and are more persistent
- Later in pregnancy, dyspnea and indigestion are more pronounced

PHYSICAL FINDINGS

- Fundal height greater than expected for dates
- Greater than expected weight gain
- Fetal movements may be detected over a wider area than a singleton
- Excessive number of fetal parts may be felt
- Two distinct fetal hearts may be heard

DIFFERENTIAL DIAGNOSIS

- Polyhydramnios
- Large singleton

COMPLICATIONS

Maternal Complications

- Preeclampsia
- Abruptio placentae
- Gestational diabetes
- Gestational hypertension
- Anemia
- Premature labour and delivery
- Polyhydramnios
- Hyperemesis gravidarum

Fetal Complications

- Prematurity, low birth weight
- Intrauterine growth restriction (IUGR)
- Congenital anomalies
- Intrauterine death
- Fetal growth discrepancies

DIAGNOSTIC TESTS

Ultrasound provides a definitive diagnosis.

MANAGEMENT

Goals of Treatment

- Early identification of multiple pregnancy
- Early identification of complications

Appropriate Consultation

Consult a physician if this diagnosis is suspected. Thereafter, consult physician if complications are suspected or detected.

Nonpharmacologic Interventions

Because multifetal pregnancies are often complicated by prematurity, the following recommendations can be made to the client:

- Complete bed rest is not recommended by the SOGC.[57] There is limited evidence to suggest the restriction of physical activity for women with multiple gestation pregnancies
- An association between stress and preterm labour has been found.[58] Provide stress counselling
- Provide nutritional counselling. Nutritional demands in a multifetal pregnancy differ from those of a singleton pregnancy, and an increase of 300 kcal daily over intake for a singleton pregnancy is recommended
- The SOGC recommends "providing information and support services for families expecting twins antenatally." This will allow "preparation for additional emotional, financial, and practical stresses related to their twins"[59]

Pharmacologic Interventions

Review iron supplementation needs with a physician for a multiple gestation pregnancy. Iron requirements for twin pregnancies are estimated to be nearly twice those of singleton pregnancies.[60] Adjust iron dosage based on hemoglobin and ferritin levels.[61]

Monitoring and Follow-Up

- Follow up in clinic every two weeks from time of diagnosis
- Have a physician review chart after every visit
- Clients with multifetal pregnancies should undergo periodic ultrasound evaluation (that is, every 2 weeks), beginning at 24 weeks' gestational age. Ultrasound is used to assess each fetus to rule out growth discrepancies, anomalies and twin-to-twin transfusion syndromes. Ultrasound may or may not be used to also assess cervical length

Referral

- Refer to an obstetrician for care
- The woman will need to be evacuated earlier than usual
- Delivery can occur around 36 weeks of gestation

CESAREAN SECTION

Twins can be delivered vaginally. Sometimes one twin is delivered vaginally and the other is delivered by cesarean section. Cesarean section is indicated under the following conditions:

Absolute Indications

- Monoamniotic twins
- Conjoined twins
- Twin "A" presenting as a footling breech, transverse lie
- Abnormal placental location (for example, placenta previa)
- More than two fetuses present

Relative Indications

- Twin "A" is a frank breech
- Suspected fetal compromise

POLYHYDRAMNIOS

Excessive amounts of amniotic fluid.[62] Affects 1% of pregnancies.

CAUSES

- Fetal anomalies
- Idiopathic
- Gestational diabetes mellitus
- Multiple gestation
- Other (for example, congenital viral infection, Bartter's syndrome, hydrops fetalis, neuromuscular disorders, maternal hypercalcemia)

HISTORY

- Usually diagnosed between 28 and 32 weeks' gestation
- Presence of predisposing maternal conditions
- Abdominal discomfort due to overstretching of uterus and abdominal wall
- Dyspnea and heartburn due to excessive elevation of diaphragm
- Leg and vulvar edema
- Excessive weight gain

PHYSICAL FINDINGS

- Weight increased (by 2–4 kg in 4 weeks) without explanation
- Uterus larger than expected for dates
- Shape of abdomen is globular
- Skin over abdomen shiny, with prominent veins and marked striae
- Fundal height greater than expected for dates
- Fetal parts difficult to feel
- Uterus tense
- Fluid thrill present: to test for this, place left hand on one side of uterus, give a sharp tap on other side of uterus – a wave will be felt against left hand
- Fetal heart beat muffled or distant or may be inaudible

DIFFERENTIAL DIAGNOSIS

- Multiple pregnancy

COMPLICATIONS[63]

The complications of polyhydramnios are related to uterine overdistention:

- Maternal respiratory compromise
- Preterm labour
- Premature rupture of membranes
- Fetal malposition
- Umbilical cord prolapse and/or postpartum uterine atony

DIAGNOSTIC TESTS

- Ultrasound confirms diagnosis

MANAGEMENT

Goals of Treatment

Early identification.

Appropriate Consultation

Consult a physician if this diagnosis is suspected.

Nonpharmacologic Interventions

Provide support and counselling as necessary to client and family.

Pharmacologic Interventions

None.

Monitoring and Follow-up

Repeated ultrasounds to monitor fluid volumes may be required.

Referral

Arrange referral to obstetrician or physician for investigation.

OBSTETRIC EMERGENCIES

BLEEDING IN PREGNANCY

A variety of conditions or problems may cause bleeding during pregnancy *(see Table 3, "Differential Diagnosis of Bleeding in Pregnancy")*. The causes may be benign or serious and vary according to the stage of pregnancy. Some are obstetric emergencies and are discussed below.[64]

Table 3 – Differential Diagnosis of Bleeding in Pregnancy

Gestational Age < 20 Weeks	Gestational Age > 20 Weeks
Implantation bleeding	Placenta previa
Delayed normal menses	Abruptio placentae
Cervical lesions (erosion, polyp, dysplasia)	Premature labour
Ectopic pregnancy	Hydatidiform mole
Spontaneous abortion (threatened, inevitable or incomplete)	Intrauterine death with labour
Missed abortion	History of penetrative intercourse

SPONTANEOUS ABORTION/ MISCARRIAGE

Loss of products of conception before 20th week of pregnancy.

Spontaneous abortion occurs in one in seven of clinically recognized pregnancies.[65]

TYPES

Threatened Abortion/Miscarriage

- Early symptoms of pregnancy may be present
- Mild cramps with bleeding (cramping may be mild or painful)
- Cervix long and closed[66]
- Uterus appropriate for gestational age or smaller
- Progresses to spontaneous abortion/miscarriage in approximately 50% of cases

Inevitable Abortion/Miscarriage

- Persistent cramping and moderate bleeding
- Cervical os is not closed
- An incompetent cervix can cause miscarriages. It is a cervix that dilates and effaces without uterine contractions and does so in the absence of pain[67,68]

Incomplete Abortion/Miscarriage

- Symptoms are similar as for inevitable abortion/ miscarriage but some products of conception are retained within the uterus. This may cause ongoing cramping and excessive bleeding
- Sterile speculum examination reveals cervical dilation, and tissue may be visualized
- Bleeding may be heavy

Complete Abortion/Miscarriage

- The entire products of conception are expelled, followed by decrease or cessation of cramping and bleeding
- On palpation, the uterus is firm and small

Missed Abortion

- Occurs when the products of conception are not expelled following embryo/fetal demise
- Signs and symptoms of pregnancy subside or cease
- Brownish vaginal discharge (rarely frank bleeding) occurs
- Cramping rare
- Uterus soft and irregular
- Ultrasound confirms embryo/fetal demise

Septic Abortion

- A potential of any miscarriage[69]
- May be accompanied by a temperature > 38°C
- The woman may report general unwellness including headaches and nausea
- Associated with intrauterine device or instrumentation during therapeutic abortion procedure
- Abdominal and uterine tenderness are present, as well as purulent discharge and possibly shock

CAUSES

- Fetal anomalies incompatible with life (chromosomal and/or other)
- Defective implantation
- Maternal infection
- Uterine and cervical anomalies

RISK FACTORS[66]

- Advancing maternal age
- Past history of spontaneous abortion
- Maternal heavy smoking
- Fever
- Low or high maternal body mass index

HISTORY

- Symptoms and signs suggestive of pregnancy [missed menstrual cycle(s), nausea, vomiting, breast tenderness]
- Cramping
- Vaginal bleeding. The passage of tissue may be noticed

All pregnant clients with a history of blood loss per vagum require assessment.

PHYSICAL FINDINGS

- Maternal heart rate may be elevated
- Blood pressure may be low
- Postural blood pressure drop may be present
- Oxygen saturation may be abnormal if in shock
- Client may appear anxious

Components of the physical examination include:

- Assessment of vital signs
- Measurement of fundal height
- Fetal heart monitoring using a Doppler fetal monitor if the estimated gestational age is greater than 10 weeks
- Sterile speculum exam to assess for openness and tissue in the os, and/or foul smelling vaginal discharge
- Bimanual examination to determine if there is pelvic tenderness to suggest septic abortion and/or tubo-ovarian abscess formation (upon consultation with a physician)

DIFFERENTIAL DIAGNOSIS

- Ectopic pregnancy
- Hydatidiform mole
- Other common causes of vaginal bleeding (for example, cervical erosion, polyp, cervicitis, cervical trauma from penetrative intercourse)

For other entities *see Table 3, "Differential Diagnosis of Bleeding in Pregnancy."*

COMPLICATIONS[70]

- Hemorrhage
- Hypovolemic shock
- Retention of products with or without endometritis
- Cervical shock (vasovagal hypotension due to dilation of cervix by tissue)
- Uterine infections

DIAGNOSTIC TESTS

- Pregnancy test positive in 75% of cases. Negative result does not rule out a spontaneous abortion/ miscarriage
- Measure hemoglobin level
- Urinalysis

MANAGEMENT

Management depends on hemodynamic status of client. See appropriate section below.

Goals of Treatment

– Prevent complications
– Control blood loss
– Maintain blood volume

In an outpatient setting it is often difficult to determine if a spontaneous abortion/miscarriage is complete or incomplete. It is prudent to manage all spontaneous abortions as incomplete abortions if accompanied by significant, active vaginal bleeding and abdominal pain.

MANAGEMENT OF THREATENED, INCOMPLETE OR INEVITABLE ABORTION/MISCARRIAGE WITHOUT HEMODYNAMIC COMPROMISE

If there is no hemodynamic compromise (for example, hypotension), threatened, incomplete or inevitable abortion/miscarriage should be managed as outlined in Table 4, "Management of Threatened, Incomplete or Inevitable Abortion without Hemodynamic Compromise."

Appropriate Consultation

Consult a physician.

Table 4 – Management of Threatened, Incomplete or Inevitable Abortion without Hemodynamic Compromise

Threatened Abortion/Miscarriage	Incomplete or Inevitable Abortion/Miscarriage
Provide emotional support	Provide emotional support
Increase rest if possible	Administer anti-D immune globulin (WinRho) to Rh-negative women, ideally within 72 hours and after consultation with a physician
Acetaminophen, 325 mg, 1–2 tabs PO q4h prn for discomfort	Discuss whether the blood product will need to be brought into the community for a specific client or if the client needs to leave the community for administration of the blood product
Nothing per vagum (no tampons, douches, intercourse)	Monitor for risk of anaphylactic reaction post administration[6]
Consider, in consultation with a physician, an ultrasound to locate embryonic/fetal cardiac activity and the gestational sac and to rule out ectopic pregnancy (cardiac activity predictive of continued pregnancy in > 90% of cases)	Tissue visible in cervical os should be gently removed with sterile ring forceps and sponge to allow contraction of uterus; minimize manipulation to minimize risk of infection
Consider monitoring quantitative β-hCG for prognosis (increase of < 66% in 48 hours predictive of abortion or ectopic pregnancy)	IV Ringer's lactate for fluid resuscitation if evidence of compromise
	Consult a physician for medical therapy. First-line therapy for bleeding from an incomplete abortion (4–12 weeks' gestation with an open os and vaginal bleeding) is usually misoprostol given orally or vaginally as a single dose or multiple doses[71]
	Advantage: no surgical intervention needed in most cases, 95–100% effective
	Side effects: some pain due to uterine contractions may occur: provide pain medication as required
	Vaginal bleeding may persist for up to 1 week
	Warning: serious side effects are rare. No need to reassess or intervene (unless heavy bleeding or infection) for at least 7 days after administration[72,73,74,75]
	Clients with incomplete abortion (tissue passed with continued bleeding) require an obstetrical consult

MANAGEMENT OF INEVITABLE OR INCOMPLETE ABORTION IN HEMODYNAMICALLY UNSTABLE CLIENT

Appropriate Consultation

Consult a physician as soon as client is stabilized.

Adjuvant Therapy

– Oxygen 10–12 L/min or more by non-rebreather mask to keep oxygen saturation > 97–98%

Initial aggressive fluid resuscitation is needed if client is in hypovolemic shock (hypotensive):

– Start two large-bore (14- or 16-gauge or greater) IV lines with normal saline or Ringer's lactate. Administer a 1 litre bolus over 15 minutes
– Reassess for signs of continuing shock q15min
– Repeat 1 litre boluses until systolic blood pressure stabilizes at > 90 mm Hg, then adjust rate according to severity of vaginal bleeding and vital signs

Refer to protocol for managing hypovolemic shock *(see the section "Shock" in Chapter 14, "General Emergencies and Major Trauma").*

Nonpharmacologic Interventions

– Nothing by mouth
– Bed rest
– Trendelenburg position (prn) to aid venous return
– Insert urinary catheter
– Monitor intake and output hourly
– Aim for urine output of 50 mL/h

Pharmacologic Interventions

Oxytocin drip 20 units in 1 L normal saline, 100 mL/hour according to physician advice.

If you cannot start IV therapy and bleeding is significant, administer:

oxytocin 10 units IM

Misoprostol is a medication that is administered rectally (route of choice if pending surgery), vaginally or orally to promote uterine contractions through the prostaglandin action; discuss/consult with physician for use and dose.[76]

Verify Rh status. Rh-negative clients must be given anti-D immune globulin (WinRho), ideally within 72 hours, if indicated (for example, fetal blood type is unknown or Rh-positive)[77] and after consultation with a physician.

Monitoring and Follow-Up

– Monitor vaginal bleeding, cramps, passage of tissue or clots, vital signs, intake and output
– Save all products of conception passed and send to hospital with client

Referral

Arrange medevac as soon as possible.

ANTEPARTUM HEMORRHAGE

Vaginal bleeding that occurs after 20 weeks of gestation.

CAUSES

The two most important causes of severe hemorrhage are placenta previa and abruptio placentae, described in Table 5, "Description and Classification of Placenta Previa and Abruptio Placentae." Other causes that may be considered are vasa previa and contact bleeding due to inflammation (for example, cervicitis).[78]

Table 5 – Description and Classification of Placenta Previa and Abruptio Placentae

Placenta Previa	Abruptio Placentae
Definition	**Definition**
A placenta implanted in the lower segment of the uterus, presenting ahead of the leading pole of the fetus[79]	Premature detachment of a normally situated placenta[80]
Painless uterine bleeding[81]	**Painful uterine bleeding**[81]
Prevalence	**Prevalence**
2.8 per 1000 pregnancies[82]	1 in 200 pregnancies[83]
Risk Factors	**Risk Factors**
Most important association is previous cesarean section Increasing maternal age, multiparity, uterine scar. Associated with breech and transverse presentations, multiple gestation, previous abdominal placental implantation	Most abruptions are idiopathic. Prior history of abruption, maternal hypertension, cigarette or cocaine use, increasing maternal age, multiparity. May be associated with preterm premature rupture of membranes, twin gestation after delivery of first infant, trauma, or abdominal trauma. Consider if motor vehicle collision and/or seat belt bruise on abdomen
Clinical Presentation	**Clinical Presentation**
Vaginal bleeding is typically painless, with bright red blood Blood loss is usually not massive with initial bleed, but bleeding tends to recur and become heavier as the pregnancy progresses, blood loss is in keeping with visualized bleed; uterine tone not increased and complete relaxation of uterus between contractions	Vaginal bleeding in 80% of cases, but may be concealed (retroplacental bleeding); therefore, maternal hemodynamic situation may not be explained by observed blood loss Pain and increased uterine tone typical and incomplete relaxation of uterus between contractions Pain increases with severity
Physical Findings	**Physical Findings**
Heart rate may be normal or elevated Blood pressure normal, low or hypotensive Postural blood pressure drop may be present Fetal heart rate usually normal Mild distress to frank shock Bright red bleeding per vagina Fundal height consistent with dates Uterus soft, normal tone, nontender Uterine size consistent with dates Transverse, oblique or breech lies common Should be suspected in client with persistent breech presentation Fetal heart rate depends on amount of bleeding Advisability of speculum examination debatable Digital cervical examination must be avoided until placenta previa is ruled out by an ultrasound scan report at 18–20 weeks or beyond that confirms the placenta is free from the os or until an ultrasound can be done to rule out placenta previa. Sterile speculum examination of the vagina may be done to visualize the cervix without fear of compromising the placenta. Visualization may reveal the cervical dilation and/or other cervical pathology and may aid in decision to transfer. Remember that antepartum bleeding may be an early sign of preterm labour. Digital cervical examination **absolutely** contraindicated	Dependent on degree of detachment, amount of blood loss With mild abruption, signs may be minimal Heart rate mildly to severely elevated Blood pressure normal, low or hypotensive Fetal heart rate elevated, reduced or absent Client may appear to be in acute distress Client may be pale or unconscious (if in shock) Vaginal bleeding moderate, profuse or absent If membranes ruptured, amniotic fluid may be bloody Uterus may be larger than expected for dates Uterus tender Increased uterine tone (tense or hard) Uterine contractions may be present and prolonged Uterus may fail to relax completely between contractions

DIAGNOSTIC TESTS

- Measure hemoglobin level
- Urinalysis
- Verify Rh status

MANAGEMENT

Goals of Treatment

- Identify condition early
- Resuscitate and stabilize if client is in shock
- Prevent complications

Appropriate Consultation

Consult a physician as soon as client is stable.

Adjuvant Therapy

- Oxygen 10–12 L/min or more by non-rebreather mask to keep oxygen saturation > 97–98%

Initial aggressive fluid resuscitation:

- Start two large-bore (14- or 16-gauge or greater) IV lines with normal saline
- Administer a 1 litre bolus over 15 minutes
- Reassess for signs of continuing shock q15min
- Repeat 1 litre boluses until systolic blood pressure stabilizes at > 90 mm Hg
- Ongoing IV therapy is based on response to initial fluid resuscitation, continuing losses, vital signs and underlying cause
- Adjust IV rate accordingly, to maintain urine output of 50 mL/h

Refer to protocol for managing hypovolemic shock *(see the section "Shock" in Chapter 14, "General Emergencies and Major Trauma").*

Nonpharmacologic Interventions

- Nothing by mouth
- Bed rest
- Trendelenburg position (prn) to aid venous return if client is in shock
- Insert urinary catheter if client is in shock
- Monitor intake and urine output hourly
- Aim for urine output of 50 mL/h

Pharmacologic Intervention[77]

Verify Rh status. Rh negative clients must be given anti-D immune globulin ideally within 72 hours, if indicated and available (for example, fetal blood type is unknown or Rh-positive)[77] and after consultation with a physician. Administer:

anti-D immune globulin (WinRho), 300 µg IM

Monitoring and Follow-Up

- Monitor vital signs q10–15min if hypotension is present or vaginal bleeding continues
- Monitor fetal heart rate q15min
- Monitor for signs of onset of labour
- Assess stability of pre-existing medical problems

Referral

Arrange medevac as soon as possible.

ECTOPIC PREGNANCY

The implantation of a fertilized ovum outside of the uterine cavity. Occurs most commonly in a uterine tube, but may also occur in the abdominal cavity, on an ovary or in the cervix. This is potentially life threatening.

CAUSES

Unknown.

RISK FACTORS

- Previous ectopic pregnancy
- Previous tubal or abdominal surgery
- Previous pelvic inflammatory disease with adhesions
- Intrauterine device

HISTORY[84]

- Abdominal pain
- With rupture, severe abdominal pain
- Symptoms of pregnancy (for example, amenorrhea)
- Abnormal vaginal bleeding, which may be only scanty spotting of dark blood
- May have previous positive pregnancy test
- Usually presents 6–8 weeks after last menstrual period, but it may be later

Acute (Ruptured) Ectopic Pregnancy

- Accounts for 40% of cases
- Sudden onset of unilateral lower abdominal pain
- Pain usually severe
- Pain may be constant or intermittent
- Pain may be severe enough to cause fainting
- Pain may become generalized or remain localized in one quadrant
- Pain may radiate to shoulder tip (in cases of massive hemorrhage)
- Nausea and vomiting frequently present
- Backache may be present

Chronic (Unruptured) Ectopic Pregnancy

- Accounts for 60% of cases
- Slight, persistent vaginal spotting over several days
- Lower abdominal discomfort (often mild)
- Attacks of sharp pain and faintness occasionally present
- Distention may be present

PHYSICAL FINDINGS

- Heart rate may be elevated
- Blood pressure low to hypotensive (if ruptured)
- Postural blood pressure drop may be present as an early sign of blood loss and postural tachycardia
- Client in moderate to acute distress
- Client may walk carefully, slightly bent forward, holding lower abdomen
- Abdominal distention may be present
- Lower abdominal tenderness
- Abdominal rebound tenderness, guarding, and/or rigidity may be present

Pelvic Examination

- Unilateral adnexal tenderness and/or tenderness in the cul de sac from hematoperitoneum
- Tender adnexal mass or fullness may be present
- Bleeding from os, but no tissue present
- Pain on movement of cervix

DIFFERENTIAL DIAGNOSIS

- Acute appendicitis
- Acute pelvic inflammatory disease
- Ruptured ovarian cyst or torsion of ovarian cyst
- Other abdominal pathology
- Spontaneous abortion

COMPLICATIONS

- Progression to rupture of an ectopic pregnancy
- Shock
- Recurrence of future ectopic pregnancy
- Maternal death (5% of all maternal deaths[85])

DIAGNOSTIC TESTS

- Serum β-hCG usually positive
- Ultrasound confirms suspicion of ectopic pregnancy

MANAGEMENT

Maintain a high index of suspicion for this diagnosis in a sexually active client who reports pain accompanied with vaginal bleeding.

Management depends on severity of pain and hemodynamic status of client. See appropriate section below.

Goals of Treatment

- Manage complications

MANAGEMENT IF PAIN NOT SEVERE AND CLIENT HEMODYNAMICALLY STABLE

Appropriate Consultation

Arrange an obstetrical consult in consultation with a physician.

Referral

Refer for urgent ultrasound, in consultation with a physician.

MANAGEMENT IF PAIN SEVERE OR CLIENT HEMODYNAMICALLY COMPROMISED

Severe pain or hemodynamic compromise suggests possible rupture.

Adjuvant Therapy[86]

- Oxygen 10–12 L/min or more by non-rebreather mask to keep oxygen saturation > 97–98%
- Start two large-bore (14- or 16-gauge or greater) IV lines with normal saline or Ringer's lactate
- Administer a 1 litre bolus over 15 minutes
- Reassess for signs of continuing shock q15min
- Repeat 1 litre boluses until systolic blood pressure stabilizes at > 90 mm Hg

– Ongoing IV therapy is based on response to initial fluid resuscitation, continuing losses, vital signs and underlying cause
– Adjust IV rate accordingly, to maintain urine output of 50 mL/h

See the protocol for managing hypovolemic shock *(see the section "Shock" in Chapter 14, "General Emergencies and Major Trauma").*

Nonpharmacologic Interventions

– Bed rest
– Trendelenburg position (prn) to aid venous return if client is in shock
– Nothing by mouth
– Monitor vital signs
– Insert urinary catheter

Pharmacologic Interventions[77]

Verify Rh status. Rh-negative clients must be given anti-D immune globulin ideally within 72 hours, if available and indicated (for example, fetal blood type is unknown or Rh-positive)[77] and after consultation with a physician.

Monitoring and Follow-Up

– Monitor vital signs closely q5–15min
– Monitor hourly intake and urine output
– Aim for urine output of 50 mL/h

Referral

Medevac as soon as possible.

HYDATIDIFORM MOLE – MOLAR PREGNANCY

A tumor composed of a mass of degenerated chorionic villi that are usually found in the uterus.

CAUSES

Largely unknown; genetic malformations suspected.

HISTORY

– Bleeding during late first trimester, early second trimester (most clients are symptomatic before the 17th week of pregnancy)
– Vaginal blood dark brown to bright red
– Spotting or profuse bleeding
– Passage of cysts in grape-like clusters
– Absence of quickening
– Hypertension may be present
– Exaggerated signs of pregnancy
– Excessive nausea and vomiting *(see the section "Hyperemesis Gravidarum")*

PHYSICAL FINDINGS[87]

– Hypertension
– Fundal height may be greater than expected, as expected, or smaller than expected for dates
– Examine tissues passed per vagum for presence of cysts
– Fetal parts not palpated
– Fetal heart tones absent

Suspect this diagnosis in clients with the following signs and symptoms:

– Hypertensive disorders of pregnancy during first half of pregnancy *(see the section "Hypertensive Disorders of Pregnancy")*
– Hyperthyroidism
– Bleeding during pregnancy accompanied by no detectable fetal heartbeat, and uterine enlargement more than expected after 12 weeks' gestation by dates
– Hyperemesis gravidarum *(see the section "Hyperemesis Gravidarum")*

DIFFERENTIAL DIAGNOSIS

– Threatened or inevitable abortion/miscarriage

For differential diagnosis of bleeding in pregnancy, *see the section "Bleeding in Pregnancy."*

COMPLICATIONS

– Hemorrhage
– Sepsis
– Choriocarcinoma (typically occurs later)

DIAGNOSTIC TESTS

– Ultrasound
– Serum β-hCG
– Urine pregnancy test
– Urinalysis: routine and microscopic
– Hemoglobin level if client is bleeding

MANAGEMENT

Goals of Treatment

– Early identification
– Prevent complications

Appropriate Consultation

Consult a physician if this diagnosis is suspected.

Monitoring and Follow-Up

Follow up is critical.

- Serial β-hCG measurements as per obstetric consultant orders
- Discuss the use of contraception (preferably oral contraceptives) to ensure no subsequent pregnancy during the surveillance period as per the consultant physician

Referral

Refer for diagnostic ultrasound and obstetric consultation in consultation with a physician. A hydatidiform mole needs to be removed.

POSTPARTUM HEMORRHAGE[88,89]

Postpartum hemorrhage (PPH) is typically defined as blood loss exceeding 500 mL. Use clinical signs and symptoms to estimate blood loss, not blood visualized.

PPH can be classified as primary PPH (occurring within 24 hours of delivery) or secondary PPH (occurring after 24 hours of delivery).

Clinical experience is necessary to determine a PPH. Blood loss will be less well tolerated if the client has low hemoglobin (anemia) or has not had the normal expansion of blood volume during pregnancy, as in cases of preeclampsia.

Table 6 – Causes, History and Physical Findings for Early and Late Postpartum Hemorrhage

Primary	Secondary
Causes	**Causes**
Tone: lack of tone is the most common cause; related to short labours, long labours, twins, polyhydramnios and a full bladder **Tissue:** retention of blood clots and products of conception **Trauma:** lacerations involving the vulva, vagina, cervix, or uterus **Thrombin:** coagulopathies	Retained products of conception Endometritis Blood-clotting abnormalities Episiotomy or vaginal hematomas
History	**History**
Presence of a risk factor (abnormality leading to one of the causes listed above) Vaginal bleeding Restlessness, anxiousness Nausea and vomiting may develop Note Rh status	Persistent bright red lochia of large or small amount Lochia may have returned to normal Client presents with sudden, severe, bright red bleeding Passage of clots and tissue Fatigue and dizziness may be present Symptoms of shock may be present Foul discharge and fever may be present
Physical Findings	**Physical Findings**
Fundal height at or above level of umbilicus Uterus soft, boggy Continued profuse bleeding after delivery Abnormal heart rate Blood pressure may be normal in well women until blood loss becomes significant Acute distress possible Placenta or membranes may look incomplete	Temperature may be elevated Heart rate rapid; may be weak, thready (if client is in shock) Blood pressure low to hypotensive (if client is in shock) Postural blood pressure drop may be present (early sign of pending shock) Client in moderate to severe distress Elevated fundal height Fundus may be soft and tender Bright red bleeding per vagum Purulent or foul-smelling discharge may be present Pelvic examination: Cervical os open, bright red bleeding from os, tissue may be present in os

COMPLICATIONS

- Anemia
- Hypotension
- Hypovolemic shock
- Secondary infection
- Sepsis
- Maternal death

DIAGNOSTIC TESTS

None.

MANAGEMENT

Goals of Treatment

- Determine cause of blood loss
- Replace blood loss
- Stimulate uterine contractions

Appropriate Consultation

Consult a physician as soon as client has been stabilized.

Adjuvant Therapy

- Oxygen 10–12 L/min or more by non-rebreather mask to achieve oxygen saturation > 97–98%
- Start 2 large-bore (14- or 16-gauge or greater) IV lines with normal saline or Ringer's lactate
- Aggressive fluid resuscitation as necessary for hemodynamic stabilization
- Administer a 1 litre bolus over 15 minutes
- Reassess for signs of continuing shock q10min
- Repeat 1 litre boluses of IV fluids until systolic blood pressure stabilizes at > 90 mm Hg
- Ongoing IV therapy is based on response to initial fluid resuscitation, continuing losses, vital signs and underlying cause
- Adjust IV rate accordingly, to maintain urine output of 50 mL/h

For protocol for managing hypovolemic shock, *see the section "Shock" in Chapter 14, "General Emergencies and Major Trauma"*.

Nonpharmacologic Interventions[90]

- Nothing by mouth
- Insert Foley catheter (bladder distention can prevent effective contraction of uterus)
- Bed rest
- Warmth
- Trendelenburg position if client is in hypovolemic shock (this may cause pooling of blood in uterus, but it is helpful)
- Massage fundus manually to stimulate uterine contraction
- Bimanual compression may be necessary if bleeding uncontrolled with therapy: firm pressure is exerted on the uterus by placing one hand externally on the fundus and one internally into the vagina to effectively compress the uterine arteries

Pharmacologic Interventions[91]

To stimulate uterine contractions:

oxytocin 10 units IM stat

and/or

20–40 units in 250 mL of normal saline infused IV at an hourly rate of 500–1000 mL

and/or

oxytocin 5 units IV push over 1–2 minutes stat (Bolus oxytocin can cause transient hypotension, then hypertension)

If necessary after oxytocin, a physician may also suggest misoprostol 600–800 µg which can be administered rectally, orally, or sublingually.

Monitoring and Follow-Up

- Monitor vital signs and condition frequently
- Monitor hourly intake and urine output
- Aim for urine output of about 50 mL/h

Referral

Arrange medevac as soon as possible. Surgical intervention may be required.

PRELABOUR RUPTURE OF MEMBRANES

Prelabour rupture of membranes (PROM) is defined as "spontaneous rupture of the membranes before the onset of regular uterine contractions." Preterm prelabour rupture of membranes (PPROM) is the spontaneous rupture of membranes before the onset of regular uterine contractions before 37 weeks of gestation.[92]

Within 24 hours of term PROM, 70% of women will give birth; 90% of women will have given birth within 48 hours of PROM.[93]

CAUSES

- Unknown
- Abdominal trauma
- Incompetence of cervix
- Polyhydramnios *(see "Polyhydramnios")*
- Multiple gestation
- Abnormal lie of fetus
- Placenta previa
- Viral or bacterial intrauterine infection

HISTORY

- Sudden gush of fluid
- Sometimes described as loss of control of bladder
- May be described as continuous trickle of fluid from vagina
- No uterine contractions felt
- Assess (from history or from records) for vaginal group B *Streptococcus* (GBS) status during pregnancy

PHYSICAL EXAMINATION

Only use sterile equipment if rupture of membranes suspected.

- Assess fluid leaking from vagina (colour, odour, amount)
- Auscultate fetal heart rate
- Assess fundal height for consistency with dates
- Assess for bleeding from vagina
- Evaluate for uterine contractions
- Palpate abdomen to assess fetal presentation

Only evaluate the cervix visually with sterile speculum. Digital cervical examination increases risk of infection (chorioamnionitis).

DIFFERENTIAL DIAGNOSIS

- Loss of bladder control
- Premature labour
- Term labour

COMPLICATIONS

- Intrauterine infection
- Preterm delivery
- Cord prolapse

DIAGNOSTIC TESTS

- Fern test of amniotic fluid on microscopic slide (dry mount, viewed at 10X, observe for fern-like crystals), if available
- Apply vaginal fluid to nitrazine paper to assess pH. It will turn blue in the presence of amniotic fluid
- Collect vaginal/rectal swab for group B *Streptococcus* if not previously done
- Urinalysis, routine and microscopic
- Urine culture

MANAGEMENT

Goals of Treatment

- Identify presence of rupture of membranes
- Prevent infection

Appropriate Consultation

Consult a physician as soon as possible.

Nonpharmacologic Interventions

- Bed rest
- Diet as tolerated
- Change sanitary pad at least q2h
- Avoid the long-term use of "Always" brand pads to prevent vulvar chemical dermatitis

Pharmacologic Interventions

Antibiotics: Discuss with a physician the need for prophylactic antibiotics.

Steroids: If transport is delayed and gestational age is less than 34 weeks, discuss with a physician the role of corticosteroids in fostering fetal lung maturation.

Monitoring and Follow-Up

- Monitor for development of labour or infection
- Monitor vital signs, including temperature, q2h
- Monitor fetal heart rate q2h if not in labour (q15min if in labour)
- Monitor vaginal loss for foul-smelling discharge
- Monitor fundus for development of tenderness

Referral

Medevac as soon as possible.

PRETERM LABOUR

"Regular uterine contractions accompanied by progressive cervical dilation and/or effacement at less than 37 completed weeks gestation." Onset of labour before 37 completed weeks of pregnancy.[94,95]

CAUSES

Unknown, however, several factors have been associated with preterm labour.

RISK FACTORS

Maternal Factors

- History of previous preterm labour
- Preterm prelabour rupture of membranes (PPROM) *(see the section "Prelabour Rupture of Membranes")*
- Low socioeconomic status
- Multifetal pregnancy *(see the section "Multiple Gestation")*
- Infection (systemic, vaginal, urinary tract, amnionitis)
- Uterine anomalies
- Antepartum hemorrhage *(see the section "Antepartum Hemorrhage")*
- Fibroids
- Retained intrauterine device
- Overdistended uterus *(see the sections "Polyhydramnios", and "Multiple Gestation")*

Fetal Factors

- Congenital anomalies
- Intrauterine death

HISTORY

- Presence of one or more risk factors
- Onset of contractions
- Contractions regular, becoming stronger and closer together
- Rupture of membranes and passage of bloody mucus may have occurred
- Clients at risk should be identified during routine prenatal visits

PHYSICAL FINDINGS

- Regular contractions (strength, frequency, duration)
- "Bloody show" may be present

Components of the physical examination include:

- Assessment of position and presentation of fetus, engagement of head externally
- Locate and record fetal heart rate
- Cervical effacement and dilation

DIFFERENTIAL DIAGNOSIS

- Braxton-Hicks contractions

COMPLICATIONS

- Progression to preterm delivery

DIAGNOSTIC TESTS

- Fern test of amniotic fluid under microscope, if available – dry mount, viewed at 10X, observe for fern-like crystals
- Apply vaginal fluid to nitrazine paper to assess pH. It will turn blue in the presence of amniotic fluid (for example, membrane rupture) (15% false positive)[96]
- Collect a vaginal/rectal culture swab for Group B *Streptococcus* (GBS) if not already done
- Urinalysis: evidence of infection may be present

MANAGEMENT

Goals of Treatment

- Recognize the woman in preterm labour and medevac asap
- Deliver preterm infant safely, if delivery necessary. *See "Delivery in the Nursing Station"*

Appropriate Consultation

Consult a physician as soon as possible.

Adjuvant Therapy

- Oxygen 4–6 L/min by mask if client breathless
- Start IV therapy with Ringer's lactate or normal saline TKVO

Pharmacologic Interventions

No intervention has been shown to effectively reduce the rates of preterm birth.

A tocolytic agent may prolong pregnancy up to 48 hours. This may provide time to administer steroids and transfer the woman to the appropriate hospital. Discuss with a physician possible use of tocolytic agent. Agents for tocolysis include indomethacin and nitroglycerin patches. There is no evidence that using multiple agents is more effective and it actually may have more side effects.

Antibiotics: Discuss with a physician the need for prophylactic antibiotics.

Steroids: If transport is delayed and gestational age is less than 34 weeks, discuss with a physician the role of corticosteroids in fostering fetal lung maturation (for example, dexamethasone, 6 mg IM q12h for 4 doses).

Monitoring and Follow-Up

Monitor uterine contractions, maternal vital signs and fetal heart rate.

Assess probability of imminent delivery on the basis of the following factors:

- Previous obstetric history
- Parity
- Frequency and intensity of uterine contractions
- Cervical effacement and dilation
- Prepare for delivery as necessary

Refer to "Delivery in the Nursing Station."

Referral

Medevac as soon as possible.

SEVERE HYPERTENSION, SEVERE PREECLAMPSIA AND ECLAMPSIA[97]

Hypertension in pregnancy is defined as a diastolic blood pressure (BP) of ≥ 90 mmHg, based on the average of at least two measurements, taken in a sitting position, using the same arm.[44,98] The Society of Obstetricians and Gynaecologists of Canada classifies hypertension in pregnancy as either pre-existing or gestational.[99] *Refer to "Hypertensive Disorders in Pregnancy" for more information.*

- Severe hypertension is a BP of > 160 mmHg systolic or a BP of ≥ 110 mmHg diastolic
- *Preeclampsia* in women with pre-existing hypertension should be defined as resistant hypertension, new or worsening proteinuria, or one or more other adverse conditions
- *Preeclampsia* in women with gestational hypertension should be defined as new-onset proteinuria or one or more adverse conditions
- *Severe preeclampsia:* Defined as preeclampsia with onset before 34 weeks' gestation, with heavy proteinuria or with one or more adverse conditions. Adverse conditions include headache, visual disturbances, abdominal or chest pain, nausea or vomiting, pulmonary edema, elevated serum creatinine
- *Eclampsia:* Convulsions or coma in pregnant or postpartum woman. Convulsion may occur in stable client with mildly elevated blood pressure in absence of excessive weight gain and/or edema

CAUSES

Unknown.[100]

HISTORY

Severe Preeclampsia

- Most common in young nulliparous or older multiparous women
- Prior signs and symptoms of preeclampsia usually present
- Fluid retention and weight gain may be present without edema
- Persistent or new/unusual headache
- Visual disturbances, altered consciousness
- Vomiting or severe nausea
- Epigastric, right upper quadrant, or chest pain
- Dyspnea

Eclampsia

- Grand mal seizure may have occurred before presentation
- Facial twitching rapidly progresses to body rigidity
- Generalized contraction and relaxation of body muscles follows
- Typically lasts for 60–75 seconds

– Coma follows the convulsion
– Client usually does not remember anything of the event
– Respiration absent during seizure
– Rapid and deep respiration usually begins after convulsion ends

One-third of seizures occur prenatally, one-third occur during labour, and one-third occur within the first 24 hours postpartum.

PHYSICAL FINDINGS

– Physical findings in eclampsia extremely variable
– Physical findings in severe preeclampsia more consistent
– Blood pressure: ≥ 160 mmHg systolic or ≥ 110 mmHg diastolic or relative hypertension compared with previous readings (in 20% of eclamptic clients)
– Heart rate rapid
– Unexpected weight gain (1 kg/week) with or without edema (but excessive weight gain and/or edema are not required for diagnosis)
– Fetal heart rate variable
– Client in acute distress
– May be stuporous, unconscious or in convulsion
– Vomiting or retching may be present
– Abdominal tenderness in right upper quadrant, epigastric area or chest
– Deep tendon reflexes hyperreactive before seizure, may be depressed afterward
– Clonus may be present
– Urine: 2+ to 4+ proteinuria
– Upon auscultation of the lungs and heart, crackles and wheezing may be heard because of pulmonary edema

COMPLICATIONS

– Maternal injury during seizure
– Repeated seizures
– Aspiration
– Fetal distress
– Preterm labour and delivery
– Abruptio placentae
– HELLP syndrome (**h**emolysis, **e**levated **l**iver enzymes, **l**ow **p**latelet count) *(see "HELLP Syndrome" under the section "Hypertensive Disorders in Pregnancy")*
– Disseminated intravascular coagulopathy
– Cerebrovascular accident
– Pulmonary edema
– Maternal death
– Fetal death

DIAGNOSTIC TESTS

– Urinalysis (for proteinuria)
– Draw blood for complete blood count, platelets, liver enzymes, LDH, uric acid, creatinine, albumin, and coagulation factors
– Measure hemoglobin level

Proteinuria[101]

All pregnant women should be assessed for proteinuria at each visit.

Urinary dipstick testing may be used for screening for proteinuria when the suspicion of preeclampsia is low. Proteinuria should be strongly suspected when urinary dipstick proteinuria is ≥ 2+.

Definitive testing for proteinuria (by urinary protein: creatinine ratio or 24-hour urine collection) is encouraged when there is a suspicion of preeclampsia, including in hypertensive pregnant women with rising BP or in normotensive pregnant women with symptoms or signs suggestive of preeclampsia. Proteinuria should be defined as ≥ 0.3 g/d in a 24-hour urine collection or ≥ 30 mg/mmol urinary creatinine in a spot (random) urine sample.

MANAGEMENT

Goals of Treatment

– Prevent intracranial hemorrhage and serious damage to other vital organs
– Prevent convulsions
– Prevent maternal injury during convulsion

Appropriate Consultation

Consult a physician and/or obstetrician as soon as possible and/or when the client is stable.

The stabilization of the client should be discussed with the referral center to determine what drug therapy should be initiated before transfer and whether the therapy should be continued in transit. If intravenous antihypertensive therapy is used, discuss whether a physician should accompany the client. Tracheal intubation and ventilation might become necessary if there is respiratory depression.

Adjuvant Therapy

- Oxygen 10–12 L/min or more by non-rebreather mask to achieve oxygen saturation > 97–98%
- Start IV therapy with normal saline to keep vein open
- Adjust IV rate if there is unusual fluid loss (vomiting, diarrhea, other)

Do **not** over-hydrate with IV fluids as this may increase risk of iatrogenic pulmonary edema.

Nonpharmacologic Interventions

- Bed rest with constant nursing care, quiet room
- Position client on her left side
- Stay with client at all times; do not leave her alone
- Nothing by mouth
- Protect airway
- Ensure that breathing and ventilation are adequate
- Have oral airway and Ambu bag at bedside
- Wipe away and suction oral secretions
- Document time, duration and type of seizure, if one occurs
- Insert Foley catheter attached to a closed drainage bag to monitor urine output closely (recommended); urinary output should be greater than 25 mL/h
- Check urine for protein hourly if initial protein assessment negative

Pharmacologic Interventions[102]

Antihypertensive therapy is used if the woman has severe hypertension (a BP of > 160 mmHg systolic or ≥ 110 mmHg diastolic). See Table 7, "Doses of Most Commonly Used Agents for Treatment of Severe Hypertension." The medications must be initiated by a physician or nurse practitioner.

Table 7 – Doses of Most Commonly Used Agents for Treatment of Severe Hypertension

Agent and Dosage	Comments
Labetalol: Start with labetalol 20 mg IV; repeat 20–80 mg IV q30min, OR 1–2 mg/min, max 300 mg (then switch to oral)	Best avoided in women with asthma or heart failure. Neonatology should be informed, as parenteral labetalol may cause neonatal bradycardia
Hydralazine: Start with hydralazine 5 mg IV; repeat 5–10 mg IV every 30 min OR 0.5–10 mg/hr IV, to a maximum of 20 mg IV (or 30 mg IM)	May increase the risk of maternal hypotension

Antiseizure therapy is used for those with severe preeclampsia and eclampsia *(see the definitions at the beginning of this section)*. The following medications must be initiated by physician or nurse practitioner:

Magnesium sulfate loading dose:

> magnesium sulfate 4 g in 100 mL of normal saline via a drip chamber infused over 20 minutes

Then reassess respiratory rate and reflexes. Piggyback administration of this drug via a main line.

Magnesium sulfate is a cerebral depressant that reduces neuromuscular irritability. It can cause vasodilation and reduction in blood pressure. Symptoms of magnesium sulfate toxicity: respiratory depression or arrest, reduced or absent deep tendon reflexes, cardiac arrest, coma.

The antidote is **calcium gluconate** (given by slow IV push over 3 minutes). **Keep preloaded syringe of 10% calcium gluconate at bedside.**

After the loading dose of magnesium sulfate:

> solution of 20 g magnesium sulfate in 1 L normal saline or Ringer's lactate infused at 2 g/h IV (100 mL/h)

Transport may be commenced once the loading dose is complete and the maintenance dose has been started.

Thromboprophylaxis: Discuss with a physician for those women who are prescribed bed rest.

Steroids: If transport is delayed and gestational age is less than 34 weeks, discuss with a physician the role of corticosteroids in fostering fetal lung maturation.

Monitoring and Follow-Up

- Monitor state of consciousness and respiratory rate constantly; monitor deep tendon reflexes (patellar) and blood pressure q5min
- Monitor fetal heart rate q30min
- If respiratory rate 8–12/min, reflexes reduced or urine output < 100 mL in previous 4 hours, reduce infusion of magnesium sulfate by 50%

– If respiratory rate < 8/min or reflexes absent, stop infusion of magnesium sulfate, then unclamp main line of Ringer's lactate and run at 100 mL/h. Consult a physician and then give antidote:

  10% calcium gluconate, 10 mL (1 g) IV over 5–10 minutes

If a seizure occurs:

– Suction nasopharynx prn
– Administer oxygen
– Position the client on her side and cushion appropriately
– Record length and type of seizure
– After seizure, assess uterine contractions, vaginal bleeding, uterine tenderness, abdominal pain and fetal heart rate
– Discuss the use of additional seizure medications with physician
– In case of prolonged seizure activity, consideration should be given to intubation by a qualified care provider

Referral

Medevac as soon as soon as possible and when client is stabilized.

DELIVERY IN THE NURSING STATION[103]

Labour occurs when regular, forceful uterine contractions cause the cervix to efface and dilate.[104]

Labour has three stages. The first stage begins with regular contractions that increase in frequency and intensity that results in cervical change and ends with full (10 cm) dilation. The second stage is from the point of full cervical dilation to the birth of the fetus. The third stage begins from the time of birth and ends once the placenta and membranes have been delivered.

PROGRESSION OF NORMAL LABOUR

For a woman with her first labour:

– The cervix will efface/thin first, then dilate/open
– Dilation progresses at about 0.5 cm to 1 cm every hour
– Once fully dilated, and actively pushing, delivery of the fetus may take up to 3 hours

For a woman who has already experienced labour:

– Effacement and dilation are extremely variable, but usually occur together
– Time to delivery of baby is also extremely variable, but is generally shorter than the first time to delivery

HISTORY

– Onset of painful, rhythmic uterine contractions
– Passage of red mucus-like material per vagina ("bloody show")
– Rupture of membranes
– Record time of onset, frequency and duration of contractions

PHYSICAL FINDINGS

– Monitor fetal heart rate
– Fetal heart rate 120–140 bpm
– Bloody show, mucus may be present

Components of the physical examination include:

– Assessment of frequency, strength and duration of contractions
– Assessment of fetal lie and presentation using Leopold's maneuvers
– Performing vaginal examination using aseptic technique: assess effacement and dilation of cervix and fetal presentation, station and flexion if possible

DIAGNOSTIC TESTS

– Urinalysis: routine and microscopy; measure for glucose and proteinuria
– Measure hemoglobin if no baseline is available

MANAGEMENT

Management varies slightly depending on how imminent delivery is. See appropriate section(s) below.

Goals of Treatment

– Ensure maternal and fetal well-being
– Delivery of baby

Appropriate Consultation

Consult a physician. **If time permits,** arrange transfer to hospital for delivery.

MANAGEMENT WHEN DELIVERY IS NOT IMMINENT

Adjuvant Therapy

Consider a saline lock for potential administration of medications.

Nonpharmacologic Interventions

- Provide emotional support and encouragement to woman during labour
- Assist with breathing through each contraction
- Provide relaxation techniques between contractions to avoid maternal exhaustion
- Have a family member or friend stay with woman during labour
- Provide water or juice as tolerated. Some women may appreciate ice chips as well
- Encourage the woman to void every 2 hours

Monitoring and Follow-Up

- Monitor progress of labour
- Monitor contractions, maternal vital signs and fetal heart rate every half hour in early stages of labour *(see "Progression of Normal Labour" at the beginning of this section)*. As the labour becomes active, assess the fetal heart rate every 15 minutes
- Perform vaginal exams every 4 hours to assess effacement and cervical dilation. Keep the number of vaginal examinations to an **absolute** minimum

Referral

When considering evacuation of a woman in labour, the following factors should be considered:

- Progress of labour
- Dilation
- Parity
- Estimated length of time required for evacuation
- If there is a possibility of the client delivering en route, keep the woman at the nursing station and deliver baby

MANAGEMENT WHEN DELIVERY IS IMMINENT

Prepare delivery equipment, resuscitation equipment and oxytocin.

Care during Delivery:

- Work with the woman to control the delivery of fetal head. This is achieved by breathing through contractions as the fetal head is crowning
- Support perineum to prevent tears
- Once head is delivered, check for presence of cord around neck by gently checking the baby's neck. If it is present, gently but firmly loop it over the head
- If unable to pull cord over head, then clamp it in two places and cut between clamps
- Gently guide the shoulder closest to the symphysis pubis towards the symphysis pubis. Once this shoulder is delivered, the posterior shoulder is gently and minimally curved towards the woman's buttocks. **DO NOT pull on the baby and DO NOT rush this process**
- Once the shoulders are delivered, the baby's body will deliver with a gentle push from the woman
- Oxytocin (10 units) IM is the preferred medication and route for the prevention of PPH in low-risk vaginal deliveries[105] once the shoulders are delivered. It is also acceptable to administer the oxytocin once the baby has been delivered. *See "Pharmacologic Interventions"* for more information

Care after Baby is Delivered:

- Ensure the baby is breathing and keep the baby warm
- If the umbilical cord is long enough, the woman can hold her baby
- After the cord stops pulsing, clamp cord in two places, and cut between clamps
- Assign APGAR scores at 1 and 5 minutes

Delivery of Placenta:

This can take up to 1 hour. **Do not pull on the cord to hasten placental delivery.**

Signs of placental separation from uterine wall:

- Woman may feel another contraction and an urge to push
- Cord may lengthen
- A gush of blood may occur

Once the placenta has separated:

- Place one hand on abdomen, just above symphysis pubis to hold the uterus
- Apply gentle traction on cord with the other hand
- Ask the woman to push with a contraction to deliver the placenta
- Examine placenta and membranes for obvious signs of incompleteness
- Place the placenta in a container to be sent for examination

After Delivery of Placenta:

– Massage uterus to ensure it is firm
– Gently but thoroughly examine perineum and vaginal channel for tears

Pharmacologic Interventions

After physician consultation, oxytocin can be administered to promote contraction of uterus (usually given after delivery of the anterior shoulder, or after the delivery of the baby up to and including within one minute of delivery of the baby)[106,107]

oxytocin 10 units IM (preferred)

or

oxytocin 5 units IV slow (over 1–2 minutes) push

or

oxytocin 20–40 units in 1L NS at 150 mL/hour[108,109]

Verify Rh status. Rh-negative clients must be given anti-D immune globulin ideally within 72 hours of delivery, if indicated (for example, fetal blood type is unknown or Rh-positive) and after consultation with a physician.[110]

POSTPARTUM MONITORING

Maternal

– Monitor vaginal blood loss, uterine tone and vital signs every 15 minutes during the first hour after delivery of the placenta, then monitor every 30 minutes for 2 hours
– Ensure the woman has an empty bladder. Catheterize if unable to void

Newborn

– Conduct newborn exam

Apply a topical antibiotic eye ointment to the palpebral conjunctiva of each eye

Erythromycin, 0.5% eye ointment, 1 cm, single dose

Administer Vitamin K to newborn's thigh within the first 6 hours of birth

Vitamin K, 1 mg, IM, single dose

Referral

Transfer the woman and baby to hospital, after consultation with a physician.

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Newfoundland and Labrador Provincial Prenatal Report (antenatal records) can be ordered by fax: 709-729-4889

Nova Scotia

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Ontario

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Prince Edward Island

The Prince Edward Island Department of Health and Wellness provides Prenatal resources on line at: http://www.gov.pe.ca/health/index.php3?number=1034879

Quebec

The on line obstetrical record (*dossier obstétrical*) is available in French only at: http://msssa4.msss.gouv.qc.ca/intra/formres.nsf/961885cb24e4e9fd85256b1e00641a29/a17558dbb46d0c3b85256ed6004bd926?OpenDocument

Saskatchewan

Prenatal form can be ordered by phone: 306-787-2056.

Manitoba

Prenatal record form. Available at: http://www.phyins.com/uploads/file/printed-materials/Prenatal-Record-Form-Top.pdf

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